



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,285	02/06/2004	Kerwin D. Dobbs	UC0406USCIP	8490

23906 7590 05/15/2006

E I DU PONT DE NEMOURS AND COMPANY
LEGAL PATENT RECORDS CENTER
BARLEY MILL PLAZA 25/1128
4417 LANCASTER PIKE
WILMINGTON, DE 19805

EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
----------	--------------

1774

DATE MAILED: 05/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/774,285

Applicant(s)

DOBBS ET AL.

Examiner

Marie R. Yamnitzky

Art Unit

1774

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 Feb 2004, 01 Jul 2004 and 27 Jul 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>rec'd 01 Jul 2004 and 27 Jul 2005</u> | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1774

1. Claims 2-5, 10 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 defines R^{12} and R^{13} , but R^{12} and R^{13} are not present in any of the formulae set forth in claim 1. Claim 2 also sets forth “COOR¹⁴” but does not define R^{14} .

Claim 3 requires the compound to have Formula I, but further defines L^2 . L^2 is present only one Formula II.

Claim 4 requires the compound to have Formula II, but further defines L^3 . L^3 is present only one Formula III.

Claim 5 requires L^1 to be selected from ligands shown in Table 5. There is no Table 5.

Claim 10, with claim 16 dependent therefrom: The third, fourth and sixth possibilities set forth in claim 10 for R^2 and R^3 appear to be in error since each formula with two “C” does not define a complete monovalent substituent. Claim 10 also sets forth “COOR¹⁴” but does not define R^{14} .

2. For purposes of comparing to the prior art:

The examiner interprets claim 2 as if “ R^{12} ”, “ R^{13} ” and “ R^{14} ” read -- R^2 --, -- R^3 -- and -- R^4 --, respectively.

The examiner interprets claim 3 as if “I” read --II--.

The examiner interprets claim 4 as if “II” read --III--.

The examiner interprets claim 5 as if “Table 5” read --Table 1--.

The examiner interprets claim 10 as if “C₂C₅”, “n-C₃C₇” and “C₄C₉” read --C₂F₅--, --n-C₃F₇-- and --C₄F₉--, respectively, and as if “R¹⁴” read --R⁴--.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-3, 5, 7-11, 14-17, 20 and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Lamansky et al. (US 6,911,271 B1).

See the whole patent. In particular, see Fig. 1d, column 5, line 16-c. 6, l. 25, c. 9, l. 40-65, and claims 1, 2, 6 and 12.

The platinum complex of the formula shown in Fig. 1d of Lamansky's patent is a compound of present Formula (II) wherein L¹ has Formula IV wherein each of R¹, R² and R³ is H, which is ligand 1-a in Table 1, and wherein L² is a monoanionic bidentate ligand which is a β-enolate. Lamansky et al. teach that this compound may be used in the emissive layer (an active layer) of an organic electroluminescent device (an organic electronic device). The emissive layer may comprise components in addition to the platinum complex. This prior art platinum complex meets the limitations of the compound required for present claims 1-3, 5, 7-11, 14-17, 20 and 21.

Art Unit: 1774

5. Claims 1-3, 5, 7-11, 14-17, 20 and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Thompson et al. (US 2003/0124381 A1).

See the whole published application. In particular, see Figure 18 and paragraphs [0042]-[0043] and [0051]-[0066].

The four platinum complexes of the formulae shown in Fig. 18 of Thompson's published application are compounds of present Formula (II) wherein L^1 has Formula IV wherein each of R^1 , R^2 and R^3 is H, which is ligand 1-a in Table 1, and wherein L^2 is a monoanionic bidentate ligand which is a β -enolate. Thompson et al. teach that these compounds may be used in the emissive layer (an active layer) of an organic electroluminescent device (an organic electronic device). The emissive layer may comprise components in addition to the platinum complex. These prior art platinum complexes meet the limitations of the compound required for present claims 1-3, 5, 7-11, 14-17, 20 and 21.

6. Claims 1-3, 5-11, 14-17, 20 and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Kamatani et al. (US 6,953,628 B2).

See the whole patent. In particular, see column 5, line 18-c. 6, l. 25, c. 11, l. 24-c. 13, l. 50, Nos. 850 and 851 in Table 1-16 (c. 41-42) and No. 871 in Table 1-17 (c. 43-44).

Kamatani's platinum coordination compound No. 850 is a compound of present Formula (I) wherein L^1 has Formula IV wherein each of R^1 , R^2 and R^3 is H, which is ligand 1-a in Table 1. Kamatani's compound No. 850 also meets the limitations of a compound of present Formula (II) wherein L^2 is a monoanionic bidentate ligand which is a ligand coordinated through a carbon

atom which is part of an aromatic group. For the compound of Formula (II), L^2 is not required to be different from L^1 , and the ligand L^1 having Formula IV is also a monoanionic bidentate ligand that coordinates through a carbon atom which is part of an aromatic group.

Kamatani's platinum coordination compound No. 851 is a compound of present Formula (I) wherein L^1 has Formula IV, R^2 is CF_3 , and each of R^1 and R^3 is H, which is ligand 1-b in Table 1 and the ligand of Formula (V) as shown in present claim 6. Kamatani's compound No. 851 also meets the limitations of a compound of present Formula (II) for the same reasons as those set forth with respect to compound No. 850.

Kamatani's platinum coordination compound No. 871 is a compound of present Formula (II) wherein L^1 has Formula IV wherein each of R^1 , R^2 and R^3 is H, which is ligand 1-a in Table 1, and wherein L^2 is a monoanionic bidentate ligand which is a β -enolate.

Kamatani et al. teach that these compounds may be used in the luminescence layer (an active layer) of an organic electroluminescent device (an organic electronic device). The luminescence layer may comprise components in addition to the platinum complex. Kamatani's compound Nos. 850, 851 and 871 meet the limitations of the compound required for present claims 1-3, 5, 7-11, 14-17, 20 and 21. Kamatani's compound No. 851 further meets the limitations of the compound required for present claim 6.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1774

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 13 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamatani et al. (US 6,953,628 B2) as applied to claims 1-3, 5-11, 14-17, 21 and 21 above, and for the further reasons set forth below.

Kamatani et al. do not disclose the specific platinum compound represented by Formula XV as shown in present claim 13 and required for the device of present claim 19, but the compound of Formula XV is within the scope of Kamatani's disclosure and would have been obvious to one of ordinary skill in the art at the time of the invention in light of Kamatani's disclosure.

Kamatani's compound No. 852 has phenylpyridine ligands having two fluorine substituents and a trifluoromethyl substituent in the same substitution pattern as the substituted phenylpyridine ligand of the compound of Formula XV. Kamatani's compound No. 852 has two substituted phenylpyridine ligands whereas the compound of Formula XV has one substituted phenylpyridine ligand and one β -enolate ligand. Based on Kamatani's general disclosure as well as the specific compounds disclosed, it would have been a *prima facie* obvious modification to one of ordinary skill in the art at the time of the invention to substitute a β -enolate ligand for one of the substituted phenylpyridine ligands of compound No. 852 in order to provide another compound that would be expected to have similar properties and to be suitable for Kamatani's purposes. Kamatani et al. teach that the metal coordination compounds may comprise a β -

enolate ligand (e.g. see formula (5) in column 6 of Kamatani's patent), and disclose various metal coordination compounds comprising a substituted phenylpyridine ligand and a β -enolate ligand (e.g. as in compound No. 871). It would have been within the level of ordinary skill of a worker in the art at the time of the invention, as a matter of routine experimentation and guided by the prior art disclosure as a whole, to determine suitable β -enolate ligands. The β -enolate ligand of the compound of Formula XV has two t-butyl groups where the β -enolate ligand of compound No. 871 has two methyl groups. However, Kamatani's disclosure suggests that β -enolate ligands having C_4H_9 groups instead of CH_3 (methyl) groups are equally suitable as Kamatani et al. disclose specific examples of compounds having a β -enolate ligand comprising C_4H_9 groups and specific examples of compounds having a β -enolate ligand comprising CH_3 groups. A C_4H_9 group has three possible structures, one of which is t-butyl as would have been readily recognized by one of ordinary skill in the art at the time of the invention.

9. Claims 1-3, 5-11, 13-17 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al. (US 6,916,554 B2) or Thompson et al. (US 7,011,897 B2).

See the entire patent to Ma et al. In particular, see column 2, lines 41-67, c. 9, l. 4-c. 12, l. 30, Table 1 (c. 18) and the claims.

See the entire patent to Thompson et al. In particular, see column 3, line 27-c. 4, l. 57, c. 13, l. 3-c. 16, l. 49, Table 1 (c. 27-30) and the claims.

Each patent discloses emissive materials for use in the emissive layer (active layer) of an organic light emitting device (an electronic device). The emissive layer may comprise

components in addition to the emissive material. The emissive materials are metal compounds having at least one ligand of present Formula IV. The metal may be platinum. For example, see c. 9, l. 30-50 of the Ma patent and c. 13, l. 30-51 of the Thompson patent. All ligands may be ligands of present Formula IV. Alternatively, the metal compounds may have a ligand of present Formula IV and one or more ancillary ligands wherein the ancillary ligand(s) may be a bidentate ligand such as a β -enolate ligand (e.g. acac or t-butylacac; see c. 11, l. 14-33 of the Ma patent and c. 15, l. 19-46 of the Thompson patent), or monodentate ligands.

Each prior art reference discloses specific examples of metal compounds having at least one ligand of present Formula IV, but the specific examples are iridium compounds. For example, Ma's compounds 10 and 11, and Thompson's compound 17, are iridium compounds having a ligand of Formula IV wherein each of R^1 and R^3 is H, and R^2 is CN. Thompson's compounds 3 and 4 are iridium compounds having a ligand of Formula IV wherein R^1 and R^2 are H, and R^3 is CF_3 . Thompson's compound 13 is an iridium compound having a ligand of Formula IV wherein R^1 is NMe_2 , R^2 is H, and R^3 is CF_3 .

Iridium and platinum are disclosed as "more" preferred metals, with iridium being the "most" preferred, and platinum compounds are encompassed by the claims of each patent. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make other emissive materials within the scope of Ma's or Thompson's disclosure, particularly other emissive materials having other metals taught by Ma et al. or Thompson et al. and having ligands similar to those of Ma's or Thompson's specific examples, with the expectation that emissive materials having different metals but the same ligands would have

similar properties and could be used for the same purpose. Given Ma's or Thompson's disclosure of iridium and platinum as more preferred metals, one of ordinary skill in the art would have been motivated to make platinum compounds similar to Ma's or Thompson's specific iridium compounds with the expectation platinum compounds would be suitable for use in the emissive layer of an organic light emitting device as taught in either reference. Regarding the number of ligands attached to platinum, Pt(II) is typically used in the art, and one of ordinary skill in the art at the time of the invention would have readily recognized that Pt(II) complexes according to Ma et al. could have a maximum of two bidentate ligands, or one bidentate ligand and two monodentate ligands.

Further, absent a showing of superior/unexpected results provided by a particular substituted phenylpyridine ligand and/or a particular combination of substituted phenylpyridine ligand and ancillary ligand(s), it is the examiner's position that it would have been within the level of ordinary skill of a worker in the art, guided by the teachings of Ma et al. or Thompson et al., to determine suitable combinations of substituents for the phenylpyridine ligand and suitable combinations of substituted phenylpyridine ligand and ancillary ligand(s). For example, regarding ligands wherein R^2 is CF_3 such as ligands of Formula V, VI and IX as set forth in present claim 6 and the substituted phenylpyridine ligand in the compound of Formula XV as set forth in claim 13, CF_3 meets the Hammett value limitation required for the substituent at the corresponding R_3 position of Ma's compounds, and CF_3 is specifically disclosed as usable for the substituent at the corresponding position of Thompson's compounds. Regarding the NMe_2 substituent on the pyridine ring in present Formula VI, VII and IX, a dialkylamino group at the

corresponding position is taught as suitable for the R' substituent in the prior art compounds (e.g. see c. 10, l. 26-35 of the Ma patent and c. 14, l. 28-37 of the Thompson patent). As previously noted, Thompson et al. also disclose a specific example of an iridium compound having a phenylpyridine ligand with NMe₂ at the corresponding position.

10. Claims 4 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al. (US 6,916,554 B2) or Thompson et al. (US 7,011,897 B2) as applied to claims 1-3, 5-11, 13-17 and 19-21 above, and further in view of Lamansky et al. (WO 02/15645 A1).

Ma et al. and Thompson et al. teach that the ancillary ligand(s) indicated in their general formulae as XY need not be bidentate. Neither Ma et al. nor Thompson et al. disclose a compound having a hydride ligand as required by present claims 4 and 12, but teach that ligands disclosed on pages 89-90 of WO 02/15645 A1 may be used as the ancillary ligands (see c. 11, l. 19-22 of the Ma patent, and c. 15, l. 24-28 of the Thompson patent). Page 90 of WO 02/15645 A1 sets forth “-R” as a ligand and, as defined on page 91, R may be hydrogen, thus providing for a hydride ligand. WO 02/15645 A1 also disclose ligands which are nonionic monodentate ligands.

Absent a showing of superior/unexpected results provided by a particular substituted phenylpyridine ligand and/or a particular combination of substituted phenylpyridine ligand and ancillary ligand(s), it is the examiner's position that it would have been within the level of ordinary skill of a worker in the art, guided by the teachings of Ma et al. or Thompson et al., to

determine suitable combinations of substituents for the phenylpyridine ligand and suitable combinations of substituted phenylpyridine ligand and ancillary ligand(s).

11. Miscellaneous:

Page 1, lines 5-6, of the specification indicates that the present application is a continuation-in-part of an application identified by docket number and filing date. Based on the docket number and filing date, the examiner expects that the related application is Application No. 10/768,209, now abandoned. Verification is required.

Claims 5 and 9 refer to a table not found in the claims. Applicant's attention is respectfully directed to MPEP 2173.05(s). In the present case, it is the examiner's position that the incorporation by reference of the table is done for applicant's convenience and is not a necessity. Applicant is required to rewrite claims 5 and 9 so as to include the table contents.

The examiner suggests inserting a comma after "V" in line 2 of claim 6.

In line 1 of claim 13, one occurrence of "Formula" should be deleted.

12. The examiner acknowledges applicant's disclosure of thirteen applications listed with the Information Disclosure Statement received July 01, 2004. The applications have been considered.

13. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

Art Unit: 1774

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY
May 10, 2006



MARIE YAMNITZKY
PRIMARY EXAMINER

1774